No.  200200145

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

New Zealand Institute for Crop & Food Research Ltd.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

PEA, FIELD

'Cruiser'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this sixteenth day of September, in the year two thousand two.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
New Zealand Institute for Crop & Food Research Ltd.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
New Zealand Name Crusader --NZ 4L28

3. VARIETY NAME
(USA and Canada) Cruiser

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Private Bag 4704
Christchurch, New Zealand

5. TELEPHONE *(Include area code)*
+64-3-325-6400

6. FAX *(Include area code)*
+64-3-325-2074

FOR OFFICIAL USE ONLY

PVPO NUMBER
200200145

FILING DATE
4-23-2002

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Ltd. (Limited)

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

9. DATE OF INCORPORATION

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
ProGene L.L.C. - Kurt Braunwart
860 S. Crestline
Othello, WA 99344

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 2705.00
DATE 4/23/02

CERTIFICATION FEE:
$ 3200
DATE 8/29/02

11. TELEPHONE *(Include area code)*
(509) 488-3977

12. FAX *(Include area code)*
(509) 488-5289

13. E-MAIL
progene@cbnn.net

14. CROP KIND *(Common Name)*
Field Pea

15. GENUS AND SPECIES NAME OF CROP
Pisum sativum

16. FAMILY NAME *(Botanical)*
Leguminosae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

- a. ☒ Exhibit A. Origin and Breeding History of the Variety
- b. ☒ Exhibit B. Statement of Distinctness
- c. ☒ Exhibit C. Objective Description of Variety
- d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
- e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
- f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
- g. ☒ Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

MAH 4/23/02

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☐ YES *(If "yes", answer items 20 and 21 below)* ☒ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ YES ☐ NO
IF YES, WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☒ NO
IF YES, SPECIFY THE NUMBER 1,2,3, *etc.* ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☒ YES ☐ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
Kurt Braunwart			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Kurt Braunwart Representative of Applicant			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Managing Owner - ProGene L.L.C.	4/20/02		

S&T-470 (04-01) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (02-99) which is obsolete. *(See reverse for instructions and information collection burden statement)*

200200145

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,705 ($320 filing fee and $2,385 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

'02 APR 25 AM 8:25

ITEM

18a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

U.S.A. May 2001; release date and sale of seed for first commercial evaluation.

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

Please see attached New Zealand Plant Variety Rights application and letter. (Pea Cultivar Pea051) Reference #. First Commercial Sales in New Zealand June 1999

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.gov/lsg/seed/ls-sd.htm

S&T-470 (04-01) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (02-99) which is obsolete.

200200145

PROGENE LLC

860 S Crestline
Othello, WA 99344
E-mail: progene@cbnn.net

Cellular: (509) 989-0405
Fax: (509) 488-5289
Phone: (509) 488-3977

To: Mark Hermeling
USDA/PVPO
Washington, D.C.

From: Kurt Braunwart
ProGene, L.L.C.

April 14, 2002

Subject: Application for PVP of field pea variety Cruiser
EXHIBIT A. Origin and Breeding History of the Variety

The original hybrid cross that Cruiser (Number denotation NZ 4L 28 and named in New Zealand as Crusader) came from was made in 1990. The cross was between the following varieties:

88V15.1 x hybrid of (Bohatyr x Hadlee)

Bohatyr is a cultivar of common knowledge originating out of Eastern Europe while Hadlee is a cultivar released by Crop & Food Research in 1994.

88V15.1 is a semi-leafless green field pea breeding line originating from the Crop & Food Research field pea breeding program. Its parentage is as follows:

88415.1 originated from a cross of two hybrid crosses as follows:
(Solara x OSU 442-15) x (Rovar x Fek)

Solara is a know cultivar from the CEBECO program of Holland
OSU 442-15 is a germ plasm line from Oregon State University
Rovar is a known named variety
Fek is a known named variety from the wrinkled, vining pea industry for fresh processed peas.

From the original cross in March 1990. F1-F3 generations were multiplied and screened for resistance to the standard strain of Pea Seed-borne Mosaic virus (Pathovar P1) in a glasshouse at Lincoln, New Zealand. Resistant F4 progeny entered a field nursery at Lincoln in October 1991/92 where single plant selections were made from superior progeny plots. Superior progeny plots were bulked in 1992 in a field nursery conducted in Chester, UK. Small observation plot trials were conducted in New Zealand at Lincoln during 1993/94 where the bulk of 4L 28 was selected for regional trials. This bulk formed the nucleus seed stock of 4L 28. Larger plot trials were conducted in Canterbury, New Zealand between 1994/95 and 1998/99 and con-current seed purification and multiplication took place.

First yield trial testing of 4L 28 occurred in the US at Washington State University in 1997 and then with both WSU and ProGene in 1998. Yield trials and seed increases have continued in the US since that time with first commercial sale of seed for evaluating field agronomic characteristics, edible production and qualities occurred in May 2001.

Application for PVP is now being made in April 2002.

Criteria used for selecting Ariel as a variety to release in the Pacific Northwest of USA.

- **seed of uniform** roundness and size
- **seed size** – we wanted a variety producing seed size of 19 to 20 grams/100 seeds
- **erect upright plant growth** all the way to dry harvest
- **high pod set** for ease of harvest
- **resistance to bleaching** of the dark green cotyledon color to pale tan/white
- **yield**
- **degree of determinant**, we wanted something a little less determinant that European semi-leafless varieties

Statement of Stability and Uniformity

This is taken from the Plant Variety Right application by Crop & Food Research in New Zealand dated March 19, 1999. (Copy of PVR application for Crusader in New Zealand is enclosed.)

4. Uniformity: Propagation is by seed. We have observed no off-types in three years of pure seed maintenance.

5. Stability: Stable for whole plant anatomical descriptors.

In addition to the New Zealand information, ProGene and its associates have found Cruiser to be stable and uniform in the 4 years that we have been working with the variety.

Statement of "No Variants"

This is covered by the statement #5 above.

In addition to this ProGene and its associates have not observed any deviation within the variety in the 4 years that we have been working with the variety.

PROGENE LLC

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Othello, WA 99344
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Fax: (509) 488-5289
Phone: (509) 488-3977

To: Mark Hermeling
USDA/PVPO
Washington, D.C.

From: Kurt Braunwart
ProGene L.L.C.

July 20, 2002

Subject: Application for PVP of field pea variety Cruiser
EXHIBIT B. Statement of Distinctness

Pacific Northwest

In Washington, Oregon, Idaho and Western Montana to most similar variety to Cruiser is Karita. Both Cruiser and Karita are green seeded semi-leafless (af) spring field pea varieties. However there are some distinct differences.

Disease Resistance – Cruiser is resistant to Fusarium wilt race 1 while Karita is not (WSU 2000, 2001).

Bleach Resistance – Cruiser is significantly more resistant to bleaching of the green cotelydon color than is Karita. (ProGene and Industry observations)

Seed size – In every comparison case out of the replicated yield trials the seed size of Cruiser is smaller than Karita seed.

North Dakota and South Dakota

In this area the most similar variety is Majoret (PVP in U.S. by owner of the variety Svalof-Weibull of Sweden) Both Cruiser and Majoret are green seeded semi-leafless spring field pea varieties.

Disease Resistance – Cruiser is resistant to Fusarium wilt race 1 while Majoret is not (WSU 2000, 2001).

Seed size – In every comparison the seed size of Cruiser was significantly smaller than that of Majoret.

(Replacement for Exhibit B to replace the letter submitted with the application on April 20, 2002.

04-18-2002

Cruiser / Karita Grams per 100 seeds comparison Pacific Northwest

TREATMENT	UI2yrs	WSU2yrs	Pro2yrs	AVERAGE
Cruiser	16.90	19.55	20.25	18.90
Karita	21.33	24.35	24.63	23.44
AVGS	19.11	21.95	22.44	21.17

ANOVA SUMMARY TABLE

SOURCE	df	SS	MS	F	SIGNF
BLOCKS	2	12.89	6.44	242.16	SIGNF
TREATMENTS	1	30.87	30.87	%1160.09	SIGNF
ERROR	2	0.05	0.03		
TOTAL	5	43.81			

LSD(5%)= 0.57

CV= 0.77%

LSD SUMMARY TABLE:

TREATMENT	OBS. MEAN	
Cruiser	18.90	A
Karita	23.44	B

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04-20-2002

Cruiser / Majoret Grams per 100 seeds comparisons for ND & SD

TREATMENT	ND2000C	ND2000M	ND2001C	ND2001M	SD2001W	AVERAGE
Cruiser	19.70	19.60	18.20	20.40	19.60	19.50
Majoret	21.80	23.50	22.20	21.90	28.00	23.48
AVGS	20.75	21.55	20.20	21.15	23.80	21.49

ANOVA SUMMARY TABLE

SOURCE	df	SS	MS	F	SIGNF
BLOCKS	4	15.33	3.83	1.05	NS
TREATMENTS	1	39.60	39.60	10.84	SIGNF
ERROR	4	14.61	3.65		
TOTAL	9	69.55			

LSD(5%)= 3.36

CV= 8.89%

LSD SUMMARY TABLE:

TREATMENT	OBS. MEAN	
Cruiser	19.50	A
Majoret	23.48	B

Attachment to Exhibit "B"

Washington State University - 2000 Progress Report - Fld Exp on Dry Pea, Winter Pea, Lentil, and Chickpea

Table 2. Summary of Green Dry Pea Yield Trial, 2000 (0001)

Cultivar	Origin	Leaf Af	Plant Le	Disease Fw	Disease Aph	Days to Flower	Days to Maturity	Nodes to Fst Flwr	Pods/ Peduncle	Pod Ht green ..cm..	Pod Ht mature ..cm..	Pod Ht index	Plant Ht green ..cm..	Plant Ht mature ..cm..	Plant Ht index	Weight 100 Seed ..g..
PS810323	X95P122	-	-	+	4	56	105	15	2	46	0	0.00	67	27	0.40	18.4
Lifter	....	+	-	+	3	55	109	14	2	60	0	0.00	72	24	0.34	19.7
PRO 8612-2G	....	-	-	+	3	56	104	16	2	54	50	0.92	60	59	0.98	20.4
CEB 1158	....	-	-	+	3	56	102	14	2	59	43	0.81	56	54	0.96	22.9
PS710308	X94P059	+	-	+	4	54	102	12	2	38	0	0.00	49	18	0.36	20.4
PS610152	X93P022	-	-	+	4	50	102	13	2	41	38	0.93	56	54	0.98	20.4
Espace	....	-	-	+	3	56	105	20	2	62	58	0.94	69	68	0.99	17.0
PS710255	X94P035	-	-	+	3	54	106	13	2	36	0	0.00	60	26	0.43	17.4
PS610150	X93P022	-	-	+	4	50	103	14	2	39	36	0.94	55	51	0.93	21.1
Karita	....	-	-	-	3	52	101	17	2	55	58	1.00	66	67	1.00	22.9
Astina	....	-	-	+	3	53	102	15	2	52	48	0.94	67	66	0.98	20.4
Franklin	....	+	-	+	4	55	101	14	2	37	0	0.00	45	16	0.36	18.3
Joel	....	+	+	+	3	50	101	12	1	76	0	0.00	95	35	0.37	22.4
PS7101119	X94P116	-	-	+	3	56	105	17	2	50	45	0.92	62	56	0.90	19.5
PS710137	X93P206	-	-	+	3	49	104	12	2	30	31	1.00	52	51	0.97	23.9
Toledo	....	-	-	+	3	54	101	16	2	54	48	0.88	63	64	1.00	21.2
Majoret	....	-	-	-	3	56	102	18	1	61	62	1.00	74	75	1.00	19.5
Scuba	....	-	-	+	3	55	101	16	2	54	51	0.95	74	71	0.96	17.6
CEB1166	....	-	-	+	2	56	101	19	2	70	65	0.93	75	71	0.94	17.1
PS710263	X94P041	-	-	+	4	51	103	12	2	32	17	0.54	68	42	0.62	19.8
Phantom	....	-	-	+	3	54	101	13	2	33	36	1.00	45	45	1.00	22.8
PS610324	X93P192	-	-	+	4	55	103	17	2	52	53	1.00	62	61	0.98	22.2
Cruiser, NZ4L28	....	-	-	+	3	56	102	16	2	53	51	0.98	67	67	1.00	16.7
Alaska 81	....	+	+	+	2	44	100	9	1	43	0	0.00	87	41	0.49	18.8
PS710048	X92P202	-	-	+	4	56	103	15	2	58	50	0.86	66	63	0.96	22.5

Table 2. Summary of the Advanced Green Dry Pea Yield Trial, 2000 (0001) Continued

Cultivar	Origin	Leaf Af	Plant Le	Disease Fw	Disease Aph	Days to Flower	Days to Maturity	Nodes to Fst Flwr	Pods/ Peduncle	Pod Ht green ..cm..	Pod Ht mature ..cm..	Pod Ht index	Plant Ht green ..cm..	Plant Ht mature ..cm..	Plant Ht index	Weight 100 Seed ..g..
CEB 1170	....	-	-	+	2	53	102	16	2	67	65	0.98	77	78	1.00	22.4
PS7101126	X94P191	-	-	-	3	56	109	17	2	56	18	0.32	75	34	0.46	20.6
PS710508	X94P026	-	-	+	3	50	101	13	2	38	36	0.96	65	61	0.93	20.9
PS710416	X94P110	-	-	+	3	55	103	18	2	58	43	0.75	68	52	0.77	20.0
NZ4L25	....	-	-	+	3	56	102	16	2	52	51	1.00	65	64	0.99	15.2
Columbian	....	+	+	+	3	42	101	10	1	51	0	0.00	98	33	0.33	19.4
PS7101123	X94P191	-	-	+	3	57	103	16	2	42	41	0.96	51	50	0.97	20.8
Grand Mean						53	103	15	2	50	34	0.70	66	51	0.80	20.1
C.V. %						1.4	1.8	6.7	13.5	12.8	14.7	22.4	8.1	1.0	7.7	2.2
LSD(0.05)						0.8	2	1	0.3	7	5	0.20	6	4	0.10	0.5

Yield data on Table 1 are means of three replications at each location.

Af = leaf type; +=normal leaf, -=afila or semileafless type.
Le = plant type; +=tall plant type, -=short plant type.

Fw = Fusarium wilt race 1; +=resistant, -=susceptible
Aph = Aphanomyces; 1=no symptoms, 2=some symptoms, 3=moderate symptoms, 4=severe symptoms, 5=dead.

Agronomic data on Table 2 are means of three replications at the Pullman, Wa location.

Pod height was measured at the green pod stage and at harvest maturity.
Pod height index was determined by dividing the value at harvest maturity by the green pod stage value.

Plant height was measured at the green pod stage and at harvest maturity.
Plant height index was determined by dividing the value at harvest maturity by the green pod stage value.

Attachment to Exhibit B

7

Washington State University - 2001 Progress Report - Fld Exp on Dry Pea, Winter Pea, Lentil, and Chickpea

Table 2. Agronomic Data from the Advanced Green Dry Pea Yield Trial, 2001 (0101)

Cultivar	Origin	Leaf Type	Plant Type	Disease Fw	Disease Aph	Days to Flower	Days to Maturity	Nodes to Fst Flwr	Pods/ Peduncle	Pod Ht (green) cm	Pod Ht (mature) cm	Pod Ht Index	Plant Ht (green) cm	Plant Ht (mature) cm	Plant Ht Index	Weight 100 Seed g
CEB 1171	-------	-	-	+	3	54	94	13	2	43	30	0.80	58	43	0.75	25.2
Bluebird	-------	-	-	+	3	53	91	15	2	43	51	1.00	59	61	1.00	24.4
Phantom	-------	-	-	+	3	52	92	14	2	44	35	0.82	48	56	1.00	26.8
PS710048	X92P202	-	-	-	3	56	90	17	2	61	0	0.00	74	26	0.38	24.1
PS810323	X95P122	-	-	+/-	3	55	92	15	2	49	0	0.00	66	22	0.29	20.1
PS810191	X94P164	-	-	+	3	56	92	20	2	64	0	0.00	71	32	0.43	20.9
PS610152	X93P022	-	-	+	3	50	92	14	2	43	0	0.00	61	30	0.43	22.1
Toledo	-------	-	-	+	3	52	90	16	2	60	53	0.81	74	79	1.00	27.0
Karita	-------	-	-	-	3	51	94	17	2	51	61	1.00	72	75	1.00	25.8
Hero	-------	-	-	-	3	54	92	16	2	53	32	0.49	68	43	0.64	23.5
PRO 98106	-------	-	-	-	3	47	88	13	2	41	22	0.50	61	41	0.63	20.9
PS810240	X94P106	-	-	+	3	56	92	19	2	75	0	0.00	82	34	0.46	22.5
CEB 1170	-------	-	-	+	3	54	93	16	2	70	51	0.80	83	62	0.82	28.3
PS810162	X94P058	-	-	+	4	47	93	12	2	36	33	0.94	62	53	0.80	23.4
Cruiser	-------	-	-	+	3	54	93	17	2	62	50	0.96	81	72	0.94	22.4
Ariel	-------	-	-	+	3	54	92	18	2	65	58	0.84	74	75	0.98	20.3
Verdi	-------	-	-	+/-	3	57	95	18	2	63	47	0.80	72	63	0.95	21.4
Espace	-------	-	-	+	3	54	90	18	2	53	56	1.00	64	78	1.00	23.7
PS710255	X94P035	-	-	+	3	55	96	13	2	37	0	0.00	68	26	0.40	19.5
Montero	-------	-	-	+/-	3	56	94	19	2	61	38	0.70	73	52	0.79	21.0
Alaska 81	X78G126	+	+	+	3	43	94	11	1	58	0	0.00	120	40	0.34	20.3
Lifter	X93P045	+	-	+	3	55	104	14	2	71	8	0.06	85	28	0.28	22.5
Joel	X84F172	+	+	+	2	46	91	13	2	84	0	0.00	131	42	0.34	24.1
Columbian	-------	+	+	+	3	42	96	8	1	35	0	0.00	110	35	0.35	21.1
PS710508	X94P026	-	-	+/-	3	46	93	12	2	40	0	0.00	69	28	0.34	20.9

Table 2. Agronomic Data from the Advanced Green Dry Pea Yield Trial, 2001 (0101) Continued

Cultivar	Origin	Leaf Type	Plant Type	Disease Fw	Disease Aph	Days to Flower	Days to Maturity	Nodes to Fst Flwr	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..
PS7101119	X94P116	-	-	+/-	3	58	94	18	2	58	17	0.18	65	31	0.40	21.7
PS710416	X94P110	-	-	+	3	54	93	18	2	57	0	0.00	75	29	0.43	23.3
Majoret	------	-	-	-	3	54	92	19	2	73	65	0.95	76	81	1.00	24.3
PS610324	X93P192	-	-	+	3	54	95	19	2	63	33	0.50	75	47	0.58	28.0
Franklin	X93P046	+	-	+	3	56	90	15	2	49	0	0.00	56	20	0.34	21.4
Grand Mean						52	93	16		55	25	0.46	74	47	0.66	
C.V. (%)						2	2	8		8	29	....	9	13	....	
LSD $_{(\alpha=0.05)}$						2	3	2		6	10	0.21	9	8	0.13	

Leaf type; + = normal leaf, - = *afila* or semileafless type.
Plant type; + = tall plant type, - = short plant type.

Fw = Fusarium wilt race 1; + = resistant, - = susceptible
Aph = Aphanomyces; 1 = no symptoms, 2 = some symptoms, 3 = moderate symptoms, 4 = severe symptoms, 5 = dead.

Agronomic data are means of three replications at Pullman, WA.

Pod and plant height were measured at the green pod stage and at harvest maturity.
Pod and plant height indices were determined by dividing the value at harvest maturity by the green pod stage value.

REPRODUCE LOCALLY. Include form number and date on all reproductions.

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(*Pea*)

OBJECTIVE DESCRIPTION OF VARIETY
PEA (*Pisum sativum* L.)

NAME OF APPLICANT(S)
New Zealand Institute for Crop & Food Research Ltd.

ADDRESS (Street and No. or RD No., City, State, and Zip Code)
Private Bag 4704
Christchurch, New Zealand

FOR OFFICIAL USE ONLY

PVPO NUMBER 200200145

VARIETY NAME
Cruiser (USA and Canada)

TEMPORARY OR EXPERIMENTAL DESIGNATION
NZ 4L28

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [0][9][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____

Please answer all questions for your variety; lack of response may delay progress of your application.

1. TYPE:

[2] 1=Garden 2=Field 3=Edible-podded 4=Other (SPECIFY) : _____

2. MATURITY:

[17] Node number of first bloom: (16.5 Avg.) [ ][ ][ ] No. of days processing [ ][ ][ ][ ] Heat Units

[ ][ ] No. of days *Earlier* than [ ] 1 = Alaska WR 2 = Thomas Laxton WR 3 = Little Marvel

MAH 8-12-02 [3][.5] No. of days *Later* than "to First Flower" [7] 4 = Wando 5 = Alderman WR 6 = Austrian Winter 7= Other = Karita

3. PLANT HEIGHT:

[0][7][4] Cm. High (73.9cm avg. maximum green height 3yrs-ten sites)

[3][9] Cm. *Shorter* than [X] Name of check cultivar Columbian

[1][0] Cm. *Taller* than [X] Name of check cultivar Hero

4. VINE:

[1.5] Habit: 1=Determinate 1.5=Intermediate 2=Indeterminate [2] Stockiness: 1 = Slim (Alaska) 2 = Medium (Thomas Laxton WR) 3 = Heavy (Alderman)

[ ] Branching: 1 = None (Alaska) 2 = 1-2 Branches (Little Marvel) 3 = More than 2 Branches (Dwarf Gray Sugar

[1] Internodes: 1 = Straight 2 = Zig Zag [2][3] (23.4) Number of nodes

5. **LEAFLETS:** None Present-Cruiser is Afilia or Semi-Leafless plant type Cruiser

[0] **Color:** 1 = Light Green (Alaska WR) 2 = Medium Green (Thomas Laxton WR) 3 = Dark Green (Alderman) 4 = Other (Specify)_____ 5 = Blue Green 6 = Yellow Green 0 = Not Applicable

200200145

[0] **Wax:** 1 = None 2 = Light 3 = Medium 4 = Heavy 0 = Not Applicable

[0] 1 = Not Marbled 2 = Marbled (Alaska) 0 = Not Applicable

[0] **Number of Leaflet Pairs:** 1 = Not Paired 2 = One 3 = Two 4 = Three or More 0 = Not Applicable

[2] **Leaflet Type:** 1 = Leafless 2 = Semi 3 = Normal

---

6. **STIPULES:**

[2] 1 = Lacking 2 = Present [1] 1 = Not Clasping 2 = Clasping

MH 8-12-02 [2] ~~1~~ 1 = Not Marbled 2 = Marbled (Lightly Marbled) [0] Size (Compared with leaflets): 1 = Smaller 2 = Same 3 = Larger 0 = Not Applicable

[0] **Color (Compared with Leaflets):** 1 = Lighter 2 = Same 3 = Darker 0 = Not Applicable

[3] **Color :** 1=Light-Green 2=Medium-Green 3=Dark-Green 4=Blue-Green 5=Yellow-Green 6=Other_____

Color Chart Value: 137 A

Select the Color Chart Used to Determine Values.

X Royal Horticulture Society Colour Chart
___ Munsell Color Chart
___ Other _____

2.5 **Stipule Size:** 1=Small 2=Medium 3=Large

Please provide comparative varieties (check varieties) and stipule color.

	Variety (1)	Variety (2)	Variety (3)
Variety Name:	Ariel	Columbian	Hero
Stipule Size:	similar to Cruiser	Similar to Cruiser	larger than Cruiser
Color Chart Value:	137 A	137 A	137 C (lighter than Cruiser)

---

7. **FLOWER COLOR:**

[6] Venation [1] Standard [1] Wing [6] Keel

1 = White
2 = Greenish
3 = Lavender
4 = Purple
5 = Red
6 = Other (specify)_____

Venation = yellow/green
Keel = pale yellow/green

8. PODS:

NZ 4L28 Cruiser

200200145

[2] Shape: 1 = Straight 2 = Slightly Curved 3 = Curved

[2] End: 1 = Pointed (Alderman) 2 = Blunt (Alaska)

[1] Color: 1 = Light Green (Alaska WR) 2 = Medium Green 3 = Dark Green (Alderman) 4 = Other (Specify) 144 B 5 = Blue 6 = Purple 7 = Yellow

[1] Surface: 1 = Smooth 2 = Rough [2] Surface: 1 = Shiny 2 = Dull

[3] Borne: 1 = Single 2 = Double 3 = Single and Double 4 = Single, Double, & Triple 5 = Double & Triple 6 = Triple 7 = Other (Specify)_____ 8 = Quad, Single, Double, Triple 9 = Quad

[0][6] CM. Length 5.87avg. cm 4 yrs.

[1][0] MM. Width (Between Sutures) 10.07 avg. mm 4 yrs.

[0][6] No. Seeds Per Pod 5.91 avg. 4 yrs.

9. SEEDS (95-100 Tenderometer):

[ ] Color: 1 = Light Green 2 = Green 3 = Dark Green 4 = Other (Specify)_____ 5 = Yellow 6 = Brown 7 = Yellow green

Seive: %	1	2	3	4	5	6	7	8	Average
	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

SEEDS (Dry, Mature):

[4] Shape: 1 = Flattened 2 = Angular 3 = Oval 4 = Rounded 5 = Splashed 6 = Flecked 7 = Bicolored

[1] Surface: 1 = Smooth 2 = Dimpled 3 = Wrinkled [2] Surface: 1 = Shiny 2 = Dull

[1] Color Pattern: 1 = Monocolor 2 = Mottled 3 = Striped 4 = Dotted

MH #8 12/02

[4] Primary Color 148A [ ] Secondary Color

1 = Creamy - White 2 = Cream & Green 3 = Light Green 4 = Medium Green 5 = Dark Green 6 = Blue-Green 7 = Yellow 8 = Brown 9 = Red 10 = Gray 11 = Black 12 = Salmon 13 = Purple 14 = Tan 15 = White 16 = Pink 17 = Yellow-Green

[2] Hilum Floor Color: 1 = White 2 = Tan 3 = Black

[1] Cotyledon Color: 146A 1 = Green 2 = Yellow 3 = Orange 4 = Cream

[1][9] Grams per 100 Seeds (avg. 18.65 2 yrs. six sites)

10. DISEASE: (0=Not Tested; 1=Susceptible; 2=Resistant) Cruiser

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

[2]	Fusarium Wilt - Race 1	[ ]	Fusarium Wilt (Near Wilt) - Race 2
[ ]	Stripe Rust *(Puccinia striiformis)*	[ ]	Loose Smut *(Ustilago tritici)*
[ ]	Tan Spot *(Pyrenophora tritici-repentis)*	[ ]	Flag Smut *(Urocystis agropyri)*
[ ]	Halo Spot *(Selenophoma donacis)*	[ ]	Common Bunt *(Tilletia tritici* or *T. laevis)*
[ ]	*Septoria nodorum* (Glume Blotch)	[ ]	Dwarf Bunt *(Tilletia controversa)*
[ ]	*Septoria avenae* (Speckled Leaf Disease)	[ ]	Karnal Bunt *(Tilletia indica)*
[ ]	*Septoria tritici* (Speckled Leaf Blotch)	[1]	Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)*
[ ]	Scab (*Fusarium* spp.)	[ ]	"Snow Molds"
[ ]	"Black Point" (Kernel Smudge)	[ ]	Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.*)*
[ ]	Barley Yellow Dwarf Virus (BYDV)	[ ]	Rhizoctonia Root Rot *(Rhizoctonia solani)*
[ ]	Soilborne Mosaic Virus (SBMV)	[ ]	Black Chaff *(Xanthomonas campestris* pv. *translucens)*
[ ]	Wheat Yellow (Spindle Streak) Mosaic Virus	[ ]	Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)*
[ ]	Wheat Streak Mosaic Virus (WSMV)	[ ]	Other (SPECIFY)
[1]	Other (SPECIFY) Enation	[ ]	Other (SPECIFY)
[1]	Other (SPECIFY) Aphonomeces-Moderate	[ ]	Other (SPECIFY)
[ ]	Other (SPECIFY)	[ ]	Other (SPECIFY)

11. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant)

[0]	Aphids	[ ]	Other (SPECIFY)

12. Additional information on any item above, or general comments that may aid in identification:

PEA 027

200200145

PLANT VARIETY RIGHTS OFFICE
Canterbury Agriculture & Science Centre
Gerald Street, Lincoln
Telephone (03) 325 6355
Fax (03) 325 2946
Please address correspondence to:
Plant Variety Rights Office
P.O. Box 130
Lincoln
Canterbury, New Zealand

COMMERCE
MINISTRY OF COMMERCE
Te Manatū Tauhokohoko

~~Dr~~ ① Adrian Russell
Bill Clark
Then
Web
② File PEA/ ?? Crusader/4428

30 April 1999

~~Mr Sam White~~
Crop & Food Research
Private Bag 4704
CHRISTCHURCH

Dear Mr White

PEA CULTIVAR 'CRUSADER' PEA051

This cultivar has been found to be distinct, uniform and stable as required for plant variety rights.

Before taking further action we must wait until 14 July 1999 this being three months after the date of publication of the New Zealand Plant Variety Rights Journal containing notice of the application. We are required to allow such a period for possible objections.

I shall contact you again after 14 July 1999.

Yours sincerely

Bill Whitmore
Commissioner

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New Zealand Institute for Crop & Food Research Limited
A Crown Research Institute

CROP & FOOD RESEARCH
Mana Kai Rangahau

19 March 1999

Mr F W Whitmore
Commissioner, Plant Variety Rights
Box 24
LINCOLN

200200145

Dear Bill

We have pleasure in submitting for your consideration, a PVR application for a new field pea cultivar, (*Pisum sativum* L.) with the breeders designation of CRUSADER. Variety CRUSADER is a white flowered, green-seeded field pea variety with an erect, semi-leafless plant type.

Please find appended the formal application, a completed objective description, and colour photographs displaying the main distinguishing features of CRUSADER over the varieties which most closely resemble it.

Supporting data:

1. Proposed name: CRUSADER

2. Breeder: New Zealand Institute for Crop & Food Research Limited

3. Essential derivation: Crusader originated from a cross made at Crop Research Division (DSIR) in 1990. The pedigree of this variety is 88V15.1//Bohatyr/Hadlee. Line 88V15.1 is a semi-leafless green field pea breeding line originating from the Crop & Food Research field pea breeding programme. Bohatyr is a cultivar of common knowledge and Hadlee is a cultivar released by Crop & Food Research in 1994.

   From the original cross in March 1990, F1-F3 generations were multiplied and screened for resistance to the standard strain of Pea Seed-borne Mosaic virus (Pathovar P1) in a glasshouse at Lincoln. Resistant F4 progeny entered a field nursery at Lincoln in October 1991/92 where single plant selections were made from superior progeny plots. Superior progeny plots were bulked in 1992 in a field nursery conducted in Chester, UK. Small observation plot trials were conducted in New Zealand at Lincoln during 1993/94 where the bulk 4L28 was selected for regional trials. This bulk formed the nucleus seed stock of 4L28. Larger plot trials were conducted in Canterbury between 1994/95 and 1998/99 and con-current seed purification and multiplication took place.

   Variety maintenance will be conducted at Crop & Food research at Lincoln using standard pure seed maintenance techniques. These involve selection of single plants of 4L28 each year which proceed to individual progeny plots in the following season. Progeny plots are bulked that will maintain the integrity of the variety. Further multiplication of 4L28 beyond pre-Basic seed will be conducted by the Head Licencee (Peter Cates Ltd) in accordance with protocols contained within the New Zealand Seed Certification scheme.

4. Uniformity: Propagation is by seed. We have observed no off-types in three years of pure seed maintenance.

Postal address:
Crop & Food Research
Private Bag 4704
Christchurch
New Zealand

Location address:
Crop & Food Research
Canterbury Agriculture & Science Ctr
Gerald St
Lincoln

Tel: +64 3 325 6400
Fax: +64 3 325 2074

Web address: http://www.crop.cri.nz

5. Stability: Stable for whole plant anatomical descriptors.

6. Distinctiveness:

Variety CRUSADER is a white flowered field pea with a spherical seed shape, and can therefore be easily distinguished from all garden pea cultivars which have white flowers and wrinkled seed (*wr*) (viz. Alderman Tall, Apex, Bolero, Combi, Dark Skinned Perfection, Early Onward, Fern Green, Frosty, Greenfeast, Horizon, Mitzi, Multistar, New Victory, Onward, Pania, Patea, Phaser, Piri, Puget, Puke, Ravel, Reco, Resal, S-out, Sela, Small Sieve Freezer, Spartan, Stringless Sugar Snap, Sugar Snap, Tasman, Tere, Triad, Trounce, Victory Freezer and William Massey.

Of the field pea varieties of common knowledge:

i) Cultivars Rex, Birte, Huka, Allure, Eiffel, Bodel and Pamaro all have a white cotyledon, CRUSADER has a green cotyledon.

ii) The marrowfat cultivars Guido, Primo, Maro and Progretta are green seeded and white flowered, but have leaves while CRUSADER has no leaves.

iii) Cultivars Whero, Crown, Courier, Magnus and Mega are all purple flowered varieties containing anthocyanin (apart from Magnus which has pink flowers) and can therefore be easily distinguished from the white flowered and anthocyanin free variety CRUSADER.

This leaves the cultivars Rhondo, Rovar, Hadlee, Beacon and Allure as the cultivars which most closely resemble CRUSADER.

CRUSADER differs from Rhondo, Rovar, Hadlee and Beacon because all of these varieties have leaves while CRUSADER has no leaves

CRUSADER differs from Allure because Allure is a semi-leafless white field pea vareity with yellow cotyledons

CRUSADER is therefore the only white flowered, semi-leafless, small-seeded, green field pea variety with resistance to Pea Seed-borne Mosaic virus (Patho-type P1)..

Please find attached photographs demonstrating the most distinguishing features of CRUSADER.

Photographs 1-3 show the leafless character of CRUSADER and the tall, erect plant type c.f. Rondo.

We thank you for your consideration of this application. If you have any questions, or require further supporting data or clarification please do not hesitate to contact me.

Yours sincerely

Adrian Russell
Grain Legume Breeder,
Contract Manager Non-Cereal Arable Crop Development
AR:HAP

Plant Variety Rights Act 1987

200200145

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APPLICATION FOR PLANT VARIETY RIGHTS

(Checklist and Instructions on reverse side.)

1. Owner(s): name(s) and address(es):

Crop & Food Research

Gerald Street

Private Bag 4704

Christchurch

New Zealand

(If NZ address)
telephone: 03 325 6400 fax: 03 325 2074

2. NZ address to which correspondence is to be sent (if different from 1.)

Carbon copies of all correspondence to be sent to:

telephone: fax:

3. Kind of plant: Common name: ~~Field pea~~

Botanical name: Pisum sativum L.

4. (a) Proposed denomination (in block letters): CRUSADER

(b) Breeder's reference (if any): 4L28

(c) Commercial synonyms (if any): -

5. (a) Name and address of original breeder(s) (if other than owner(s):

To the best of my(our) knowledge there is no other original breeder

(b) If original breeder(s) other than owner(s), indicate whether the variety was transferred to owner(s) by:

contract succession other (specify):

6. Have applications for plant variety protection been made in other countries:: Yes ✓ No
If "yes" give details below:

Country	Application date	Application No.	Stage	Denomination (or breeder's reference)

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In the "Stage" column indicate whether - pending, rejected, withdrawn, or rights granted.
(Instructions on reverse side)

200200145

7. Priority is claimed in respect of the application filed in (country) _____

on (date) _____ under the denomination _____

8. *(answer both (a) and (b))*

(a) The variety -

☐ has not been offered for sale or sold in New Zealand.

☑ was offered for sale or sold in NZ for the first time on (date) ____1-9-98_____

under the denomination _____4L28_____

(b) The variety -

☑ has not been offered for sale or sold abroad.

☐ was offered for sale or sold abroad for the first time in -

(country) _____

on (date) _____ under the denomination _____

9. ▪ Plant material.

I/We declare that the material provided, or to be provided, in relation to this variety is, or will be, representative of the variety.

*(**Important:** With certain kinds of plants a specified quantity of seed or colour photographs must be supplied at the time of application. See instructions.)*

▪ I/We apply for Plant Variety Rights.

▪ I/We declare that, to the best of my/our knowledge, the information necessary for the examination of the application, given in this form and in any attachments is complete and correct.

Signature(s): _____ Date: 15/3/99

(Refer to checklist on reverse of first page before lodging application.)

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TECHNICAL QUESTIONNAIRE 200200145

To be completed in connection with an application for plant variety rights for a variety of

PEAS (*Pisum sativum* L. *sensu lato*)

---

1. Proposed denomination or breeder's reference: CRUSADER (Breeders reference 4L28)

---

2. Describe the origin, breeding and maintenance of the variety

Crusader originated from a cross made at Crop Research Division (DSIR) in 1990. The pedigree of this variety is 88V15.1//Bohatyr/Hadlee. Line 88V15.1 is a semi-leafless green field pea breeding line originating from the Crop & Food Research field pea breeding programme. Bohatyr is a cultivar of common knowledge and Hadlee is a cultivar released by Crop & Food Research in 1994.

From the original cross in March 1990, F1-F3 generations were multiplied and screened for resistance to the standard strain of Pea Seedborne Mosaic virus (Pathovar P1) in a glasshouse at Lincoln. Resistant F4 progeny entered a field nursery at Lincoln in October 1991 where single plant selections were made from superior progeny plots. Superior progeny plots were bulked in 1992 in a field nursery conducted in Chester, UK. Small observation plot trials were conducted in New Zealand at Lincoln during 1993/94 where the bulk 4L28 was selected for regional trials. This bulk formed the nucleus seed stock of 4L28. Larger plot trials were conducted in Canterbury between 1994/95 and 1998/99 and con-current seed purification and multiplication took place.

Variety maintenance will be conducted at Crop & Food research at Lincoln using standard pure seed maintenance techniques. These involve selection of 50 single plants of 4L28 each year which proceed to individual progeny plots in the following season. Progeny plots are bulked that will maintain the integrity of the variety. Further multiplication of 4L28 will be conducted in accordance with protocols contained within the New Zealand Seed Certification scheme.

---

3. Characteristics of the variety (indicate which state of expression best corresponds)

3.1	Seed: colour of cotyledon	green
3.2	Seed: marbling	absent
3.3	Seed: violet or pink spots on testa	absent
3.4	Seed: black colour of hilum	absent
3.5	Plant: anthocyanin colouration	absent
3.6	Seed: weight	very small
3.7	Seed: time of maturity	medium
3.8	Foliage: colour	green
3.9	Leaf: leaflets	absent
3.10	Stipules:	well developed

3.11	Stipules: flecking	present
3.12	Time of flowering:	medium
3.13	Flower: anthocyanin (varieties with anthocyanin only)	N/A
3.14	Pod: length (at second flowering node)	medium
3.15	Pod: parchment	entirely present
3.16	Pod: thickened wall (varieties with no or partial parchment)	N/A
3.17	Pod: shape of distal part (varieties without thickened pod wall)	blunt
3.18	Pod: colour	green
3.19	Pod: colour of immature seed	light green

4. List and compare the varieties that most closely resemble yours (include Australian varieties if appropriate)

Denomination(s) of variety(ies) similar to yours	Characteristic(s) *(eg plant height)* in which the similar variety differs from yours	Describe the expression of the characteristic(s) for the similar variety *(eg short)*	Describe the expression of the characteristic(s) for your variety *(eg tall)*
Rovar	Leaflets	Present	Absent
Hadlee	Leaflets	Present	Absent
Beacon	Leaflets	Present	Absent
Allure	Cotyledon colour	Yellow	Green

5. Additional information which may help to distinguish the variety

Crusader is currently the only small seeded, green field pea cultivar grown commercially in New Zealand that is semi-leafless and resistant to the standard strain of Pea Seed-borne Mosaic virus. Crusader is a tall variety with a strong, stiff straw that frequently remains erect until harvest maturity.

5.1 Resistance to pests & diseases

Resistant to the Standard strain of Pea Seedborne Mosaic virus (Pathovar P1)

200200145

5.2 Special conditions for the examination of the variety

5.2.1 Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health in the country where the examination will be carried out? (no)

5.2.2 Has such authorization been obtained? (N/A)

If the answer is 'yes', please attach a copy of such authorization

5.3 Other information

Crusader will be marketed via Peter Cates Ltd, who are the proposed Head Licencee. The variety will be entered into the New Zealand Seed Certification Scheme. The intended use is for export of the dry grain to international food markets.

Signature ..... Date 15/3/99

200200145

June 1996

PLANT VARIETY RIGHTS OFFICE

NEW ZEALAND

OBJECTIVE DESCRIPTION OF VARIETY

PEAS (*Pisum sativum* L. *sensu lato*)

Name of Applicant(s):	Variety name or temporary designation: CRUSADER
New Zealand Institute for Crop & Food Research	PVRO Number:

- Circle the appropriate number that best describes the characteristic of the variety. Intermediate states of the full scale of 1 to 9 may be used if necessary.
- Characteristics marked with an asterisk (*) must be included in the description.
- For characteristics marked with a cross (+) , refer to the appendix.

Field Tests

- The objective description must be prepared from plants grown in field tests in New Zealand.
- The tests must be carried out at one place over two growing seasons.
- Each test should include at least 100 plants of the candidate variety divided between two or more replicates. All plants should be used for the testing of uniformity; in the case of 100 plants the maximum number of offtypes allowed would be three.
- All observations determined by measurement or counting should be made on 20 plants or parts of 20 plants.

	Characteristic	Stage		Example Variety	
1.	Seed: shape	00	spherical		(1)
			ovoid	Birte, Solara	2
			cylindrical		3
			rhomboid	Maro, Progreta	4
			triangular		5
			irregular		6
2*+.	Seed: shape of starch grain	00	simple	Maro, Solara	(1)
			compound		2
3*.	Seed: colour of cotyledon	00	green	Solara	(1)
			yellow	Birte	2

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4*.	Seed: marbling of testa (*varieties with anthocyanin only*)	00	absent present		1 9
5*.	Seed: violet or pink spots on testa (*varieties with anthocyanin only*)	00	absent faint intense		1 2 3
6*.	Seed : black colour of hilum	00	absent present		(1) 9
7.	Seed: colour of testa (*varieties with anthocyanin only*)	00	reddish brown brown brownish green		1 2 3
8+.	Seed: dimpled cotyledons (*varieties with unwrinkled seed and simple starch grains only*)	00	absent present	Birte, Solara Maro, Progreta	1 9
9*.	Plant: anthocyanin colouration	00-320	absent present	Solara	(1) 9
10+.	Plant: height	218	very short short medium tall very tall	Birte	1 3 5 (7) 9
11.	Stem: fasciation	30-199	absent present		(1) 9
12*+.	Stem: length	240	very short short medium long very long	Birte	1 3 5 (7) 9
13.	Stem: number of nodes up to and including first fertile node	230-240	very few few medium many very many		1 3 (5) 7 9
14.	Stem: anthocyanin colouration of axil (*varieties with anthocyanin only*)	30-240	absent present	Maro	1 9
15.	Stem: type of anthocyanin colouration of axil (*varieties with anthocyanin only*)	30-240	single ring double ring		1 2

16*.	Foliage: colour	40-240	yellow green		1
			green		(2)
			blue green		3
17+.	Foliage: intensity of colour	40-240	light		3
	(*green varieties only*)		medium	Rondo	(5)
			dark		7
18.	Foliage: greyish hue	40-240	absent		(1)
			present	Solara	9
19*.	Leaf: leaflets	20-240	absent	Solara	(1)
			present		9
20.	Leaf: waxiness of surface of upper leaflet	30-240	absent		1
			present	Maro	9
21.	Leaf: average maximum number of leaflets	30-240	few		3
			medium		5
			many		7
22.	Leaflet: size	216-226	very small		1
			small		3
			medium		5
			large		7
			very large		9
23.	Leaflet: length	216-226	short		3
			medium	Bohatyr	5
			long		7
24.	Leaflet: width	216-226	narrow		3
			medium		5
			broad		7
25.	Leaflet: distance from widest point to base	216-226	short		3
			medium	Maro	5
			long		7
26+.	Leaflet: dentation	30-240	absent		1
	9			present	
27+.	Leaflet: degree of dentation	30-240	very weak	Progreta	1
			weak		3
			medium		5
			strong		7
			very strong		9
28*.	Stipule: type of development	30-240	rudimentary		1
			well developed	Progreta, Solara	(2)

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29+.	Stipule: 'rabbit-eared' stipules	30-240	absent	Birte	(1)
			present	Progreta	9
30.	Stipule: waxiness of surface of upper stipule	30-240	absent		1
			present	Maro	(9)
31+.	Stipule: length	216-226	short		3
			medium		(5)
			long		7
32+.	Stipule: width	216-226	narrow		3
			medium		(5)
			broad		7
33*+.	Stipule: flecking	20-240	absent		1
			present	Maro	(9)
34+.	Stipule: maximum density of flecking	20-240	very sparse	Progreta	1
			sparse		(3)
			medium		5
			dense		7
			very dense		9
35+.	Petiole: length from axil to the first tendril (*varieties without leaflets only*)	216-226	short		3
			medium	Solara	(5)
			long		7
36.*+.	Time of flowering	214	very early		1
			early		3
			medium		(5)
			late		7
			very late		9
37.*	Plant: maximum number of flowers per node (*non-fasciated varieties only*)	216-226	one		1
			one to two		2
			two	Birte, Maro	(3)
			two to three		4
			three		5
			three to four		6
			more than four		7
38.*	Flower: anthocyanin colouration of wing (*varieties with anthocyanin only*)	216-218	pink blush		1
			pink		2
			reddish purple		3
39.	Flower: intensity of reddish purple colouration of wing (*reddish purple flowered varieties only*)	216-218	weak		3
			medium		5
			strong		7

40.	Flower: intensity of colour of standard (*reddish purple flowered varieties only*)	216-218	weak		3
			medium		5
			strong		7
41+.	Flower: colour of standard (*varieties without anthocyanin only*)	216-218	white		1
			white to cream	Maro	2
			cream		3
42+.	Flower: maximum width of standard	216-218	narrow	Progreta	3
			medium		(5)
			broad		7
43+.	Flower: shape of base of standard	216-218	strongly raised		1
			raised	Progreta	3
			level	Solara	(5)
			arched		7
			strongly arched	Bohatyr	9
44.	Flower: intensity of undulation of standard	216-218	absent or very weak		1
			weak		(3)
			medium		5
			strong		7
			very strong		9
45.	Flower: width of sepal	216-226	narrow		3
			medium		(5)
			broad		7
46.	Flower: shape of apex of upper sepal (at second flowering node)	212-240	acuminate		1
			pointed		(2)
			rounded		3
47+.	Flower: length of peduncle from stem to first flower	218-224	short		3
			medium	Bohatyr, Maro	(5)
			long		7
48*.	Pod: length (at second flowering node)	240	very short		1
			short	Solara	3
			medium		(5)
			long		7
			very long		9
49*+.	Pod: maximum width (at second flowering node)	240	very narrow		1
			narrow		3
			medium		(5)
			broad		7
			very broad		9
50+.	Pod: parchment	310	absent		1
			partially absent		2
			entirely present		(3)

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51.	Pod: thickened wall (*varieties with no or partial parchment only*)	240	absent present		1 9
52*+.	Pod: degree of curvature	240	absent or very weak weak medium strong very strong	Maro	(1) 3 5 7 9
53*+.	Pod: type of curvature	240	concave convex		(1) 2
54*+.	Pod: shape of distal part (*varieties without thickened pod wall only*)		pointed blunt	Solara	1 2
55*.	Pod: colour	240	yellow green blue-green purple	Solara	1 (2) 3 4
56.	Pod: intensity of green colour	240	light medium dark	Solara	3 (5) 7
57.	Pod: strings of suture (*varieties with no or partial parchment only*)	240-245	absent or rudimentary present		1 9
58.	Pod: anthocyanin colouration of suture (*varieties with anthocyanin only*)	240-255	absent present		1 9
59.	Pod: spots of anthocyanin colouration on outer wall (*varieties with anthocyanin only*)	240-255	absent present		1 9
60*+.	Pod: number of ovules	230-240	few medium many	Birte	3 (5) 7
61.	Pod: intensity of green colour of immature seed	230-240	light medium dark	Solara	(3) 5 7
62.	Seed: time of maturity	320	very early early medium late very late		1 3 (5) 7 9

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63.	Seed: wrinkling of cotyledon	320	absent present	Maro, Solara	(1) 9
64.	Seed: degree of wrinkling of cotyledon	320	weak medium strong	absent.	3 5 7
65*+.	Seed: size	320	very small small medium large very large	Maro	(1) 3 5 7 9
66+.	Resistance to *Fusarium oxysporum f. sp. pisi*				
66.1	Race 1		absent present		1 (9)
66.2	Race 2		absent present		1 9
66.3	Race 5		absent present		1 9
66.4	Race 6		absent present		1 9
67+.	Resistance to *Erysiphe pisi* Syd.		absent present		(1) 9
68+.	Resistance to *Ascochyta pisi*, Race C		absent present		1 9
69+.	Resistance to *Pseudomonas syringae pv. pisi*				
69.1	Pathovar 2		absent present		1 9
69.2	Pathovar 4		absent present		1 9
70+.	Resistance to Seedborne Mosaic Virus (SbmV), Strain P1		absent present		1 (9)
71+.	Resistance to Bean Yellow Mosaic Virus (BYMV)		absent present		1 9
72+.	Resistance to Pea Enation Mosaic Virus (PEMV)		absent present		(1) 9

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New Zealand Institute for Crop & Food Research Limited
A Crown Research Institute

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CROP & FOOD RESEARCH

Mana Kai Rangahau

19 January 2000

To whom it may concern

This is to certify that the two field pea (*Pisum sativum*) cultivars currently known as 4L25 and Crusader (formally breeding line 4L28) submitted by Mr Kurt Braunwart of Progene LLC) for Plant Variety Protection in the USA were bred, and are owned by the New Zealand Institute for Crop & Food Research Ltd.

Progene LLC have been appointed Production and marketing Licencee for the USA for both cultivars and are authorized by us to apply for Plant Variety Protection in this territory and submit all necessary documentation to the PVP office.

Yours sincerely

Adrian Russell
Contract Manager - Non-Cereal Arable Crop Development
Russella@crop.cri.nz

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Private Bag 4704
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Location address:
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Canterbury Agriculture & Science Centre
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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued *(7 U.S.C. 2421)*. The information is held confidential until the certificate is issued *(7 U.S.C. 2426)*.

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
New Zealand Institute for Crop and Food Research Ltd.	New Zealand name Crusader NZ 4L28	Cruiser (USA and Canada)
4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	**5. TELEPHONE** *(Include area code)*	**6. FAX** *(Include area code)*
Private Bag 4704 Chrischurch, New Zealand	+64-3-325-6400	+64-3-325-2074
	7. PVPO NUMBER 200200145	

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain** [X] YES [ ]

9. Is the applicant (individual or company) a U.S. National or a U.S. based company? **If no, give name of country** [ ] YES [X] NO

New Zealand

10. Is the applicant the original owner? [X] YES [ ] NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

[ ] YES [ ] NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

[ ] YES [X] NO **If no, give name of country**

New Zealand

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

Attached please find a FAX of a letter written and signed by Crop and Food Research atesting to their ownership of the Green Field Pea Variety Cruiser.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.